

What is claimed is:

1. A heat-sensitive recording material which comprises at least (a) a support, (b) a heat-sensitive recording layer formed on at least one side of the support and containing an electron-donating compound and an electron-accepting compound and (c) a protective layer, the protective layer being an outermost layer provided by being formed on a smooth-surfaced substrate and removing the smooth-surfaced substrate, and the protective layer surface having a distinctness of image (according to JIS K 7105-1981) of at least 75% (slit width 2 mm).
2. The heat-sensitive recording material according to claim 1, wherein the recorded portion formed by carrying out recording from the protective layer side with an energy of  $80 \text{ mJ/mm}^2$  by a thermal head shows a distinctness of image (according to JIS K 7105-1981) of at least 75% (slit width 2 mm).
3. The heat-sensitive recording material according to claim 1, wherein the recorded portion formed by carrying out recording from the protective layer side

with an energy of 80 mJ/mm<sup>2</sup> by a thermal head is 0.15 to 0.50 µm in root-mean-square average of roughness (according to JIS B0601-1982) as determined by an interference microscope (JIS B0652-1973).

5

4. The heat-sensitive recording material according to claim 1, wherein the recorded portion formed by carrying out recording from the protective layer side with an energy of 80 mJ/mm<sup>2</sup> by a thermal head exhibits 10 a gloss (JIS P 8142-1993) of 30% or more at 20 degrees and 85% or more at 75 degrees.

5. The heat-sensitive recording material according to claim 1, wherein the smooth-surfaced substrate is 0.05 15 to 0.20 µm in the root-mean-square average of roughness (JIS B0601-1982) as determined by an interference microscope (JIS B0652-1973).

6. The heat-sensitive recording material according to 20 claim 1 which comprises:

- (a) the support (S),
- (b) (b1) the heat-sensitive recording layer (TG)  
formed on at least one side of the support, or  
(b2) the heat-sensitive recording layer (TG)  
25 formed on at least one side of the support and an

特許出願書類・審査記録

adhesive layer (EB) formed on the heat-sensitive recording layer, or

(b3) an adhesive layer formed (EB) on at least one side of the support and the heat-sensitive

5 recording layer (TG) formed on the adhesive layer; and

(c) the protective layer (OC), and if desired,

(d) an intermediate layer (ML) formed between the heat-sensitive recording layer (TG) and the protective layer (OC) or between the heat-sensitive recording layer (TG) and the adhesive layer (EB),

the protective layer being an outermost layer provided by being formed on a smooth surface of a

15 smooth-surfaced substrate and removing the substrate, and

the protective layer surface having a distinctness of image of at least 75% (according to JIS K 7105-1981, slit width 2 mm).

20

7. The heat-sensitive recording material according to claim 6 which comprises :

(a) the support (S),

(b) the heat-sensitive recording layer (TG) formed on 25 one side of the support, the intermediate layer

(ML) formed on the heat-sensitive recording layer and the adhesive layer (EB) formed on the intermediate layer, and

(c) the protective layer (OC).

5

8. The heat-sensitive recording material according to claim 6, wherein the protective layer comprises a water-soluble or water-dispersible resin.

10 9. The heat-sensitive recording material according to claim 7, wherein the adhesive layer is provided by forming an uncured adhesive layer containing an electron beam-curable compound and curing the electron beam-curable compound by irradiation with electron beam.

15

10. The heat-sensitive recording material according to claim 9, wherein the electron beam-curable compound is a hydroxyl group-containing electron beam-curable compound.

20

11. The heat-sensitive recording material according to claim 10, wherein the hydroxyl group-containing electron beam-curable compound is 2-hydroxyethyl (meth)acrylate, 2-hydroxypropyl (meth)acrylate, 2-

25

20202020 \* ETS/UNIT

hydroxy-3-phenoxypropyl acrylate or (meth)acrylic acid condensate of epichlorohydrin-alkanediol polymer.

12. A process for producing a heat-sensitive recording  
5 material which comprises:

- (e) a support (S),
- (f) (b1) a heat-sensitive recording layer (TG) formed on at least one side of the support, or
  - (b2) a heat-sensitive recording layer (TG) formed on at least one side of the support and an adhesive layer (EB) formed on the heat-sensitive recording layer, or
    - (b3) an adhesive layer (EB) formed on at least one side of the support and the heat-sensitive recording layer (TG) formed on the adhesive layer; and
- (g) a protective layer (OC), and if desired,
- (h) an intermediate layer (ML) formed between the heat-sensitive recording layer (TG) and the protective layer (OC) or between the heat-sensitive recording layer (TG) and the adhesive layer (EB),

the protective layer surface having a distinctness of image of at least 75% (according to JIS K 7105-1981, slit width 2 mm),

20202100-27627300

the process comprising forming the protective layer on  
a smooth-surfaced substrate with a smooth surface  
which is about 0.05 to about 0.20  $\mu\text{m}$  in the root-mean-  
square average of roughness (according to JIS B0601-  
5 1982) as determined by an interference microscope  
(according to JIS B0652-1973), and removing the  
substrate.

13. The process according to claim 12, which comprises any  
10 one of the following processes:

(i) a process comprising combining

the protective layer (OC) formed on the smooth-  
surfaced substrate and comprising a water-soluble or  
water-dispersible resin with

15 a laminate comprising the support (S), the heat-  
sensitive recording layer (TG), the intermediate  
layer (ML) and an uncured adhesive layer (EB)  
comprising an electron beam-curable compound in this  
order,

20 in such a manner that the protective layer (OC)  
is brought into contact with the uncured adhesive  
layer (EB),

irradiating the combined product with electron  
beam to cure the electron beam-curable compound, and  
25 removing the smooth-surfaced substrate,

(ii) a process comprising combining

the protective layer (OC) formed on the smooth-surfaced substrate and an uncured adhesive layer (EB) comprising an electron beam-curable compound and formed on the protective layer, or an uncured protective layer (OC(EB)) comprising an electron beam-curable compound and formed on a smooth-surfaced substrate, with

5 a laminate comprising the support (S), the heat-sensitive recording layer (TG) and the intermediate layer (ML) in this order,

10 in such a manner that the adhesive layer (EB) or the protective layer (OC(EB)) comprising an electron beam-curable compound is brought into contact with the intermediate layer (ML),

15 irradiating the combined product with electron beam to cure the electron beam-curable compound, and removing the smooth-surfaced substrate,

(iii) a process comprising combining

20 the protective layer (OC) comprising a water-soluble resin or water-dispersible resin and formed on the smooth-surfaced substrate and the heat-sensitive recording layer (TG) formed on the protective layer and the intermediate layer (ML)

25 formed on the heat-sensitive recording layer with

a laminate comprising the support (S) and an uncured adhesive layer (EB) comprising an electron beam-curable compound in this order,

in such a manner that the intermediate layer  
5 (ML) is brought into contact with the uncured adhesive layer (EB),

irradiating the combined product with electron beam to cure the electron beam-curable compound, and removing the smooth-surfaced substrate,

10 (iv) a process comprising combining the substrate (S) with a laminate formed on the smooth-surfaced substrate and comprising the protective layer (OC) comprising a water-soluble or water-dispersible resin, the heat-sensitive recording layer (TG), the intermediate layer (ML) and an uncured adhesive layer (EB) comprising an electron beam-curable compound in this order,

15 in such a manner that the uncured adhesive layer (EB) is brought into contact with the support (S),

irradiating the combined product with electron beam to cure the electron beam-curable compound, and removing the smooth-surfaced substrate, and

20 (v) a process comprising combining a laminate comprising an uncured protective layer

25

(OC(EB)) comprising an electron beam-curable compound, an intermediate layer (ML), a heat-sensitive recording layer (TG) and a support (S) in this order, with

5           a smooth-surfaced substrate,  
              in such a manner that the uncured protective  
              layer (OC(EB)) is brought into contact with the  
              smooth-surfaced substrate,  
              irradiating the combined product with electron  
10          beam to cure the electron beam-curable compound,  
              and removing the smooth-surfaced substrate.

14. A process according to claim 13, wherein the adhesive  
              layer contains a pigment having an average particle  
15          size of 0.2 to 3  $\mu\text{m}$ .

15. A process according to claim 13, wherein the electron  
              beam-curable compound is a hydroxyl group-containing  
              electron beam-curable compound.

20          16. A process according to claim 13, wherein wherein the  
              hydroxyl group-containing electron beam-curable  
              compound is 2-hydroxyethyl (meth)acrylate, 2-  
              hydroxypropyl (meth)acrylate, 2-hydroxy-3-  
25          phenoxypropyl acrylate or (meth)acrylic acid

-73-

condensate of epichlorohydrin-alkanediol polymer.

RECORDED AND INDEXED BY J. M. HARRIS